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## Twenty-fold acceleration of 3D projection reconstruction MPI.

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### Public Summary:

We experimentally demonstrate a 20-fold improvement in acquisition time in projection reconstruction (PR) magnetic particle imaging (MPI) relative to the state-of-the-art PR MPI imaging results. We achieve this acceleration in our imaging system by introducing an additional Helmholtz electromagnet pair, which creates a slow shift (focus) field. Because of magnetostimulation limits in humans, we show that scan time with three-dimensional (3D) PR MPI is theoretically within the same order of magnitude as 3D MPI with a field free point; however, PR MPI has an order of magnitude signal-to-noise ratio gain.

### Scientific Abstract:

We experimentally demonstrate a 20-fold improvement in acquisition time in projection reconstruction (PR) magnetic particle imaging (MPI) relative to the state-of-the-art PR MPI imaging results. We achieve this acceleration in our imaging system by introducing an additional Helmholtz electromagnet pair, which creates a slow shift (focus) field. Because of magnetostimulation limits in humans, we show that scan time with three-dimensional (3D) PR MPI is theoretically within the same order of magnitude as 3D MPI with a field free point; however, PR MPI has an order of magnitude signal-to-noise ratio gain.

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